

AMENDMENTS TO THE CLAIMS:

Listing of Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Claim 16 (Previously Presented) A sound source identifying and separating apparatus, characterized in that it comprises:

a sound collecting means including a pair of sound collecting microphones juxtaposed with each other across a preselected spacing and opposed to a plurality of sound sources, said two microphones each individually capturing mixed sounds from said sound sources therewith;

an imaging means and/or a sensing means, said imaging means being adapted to consecutively image objects that can be said sound sources, said sensing means sensing directions in which said objects possibly being said sound sources are located;

a sound processing means for determining the directions of all said sound sources based on sound information for a difference between phases and a difference between intensities which each of said mixed sounds from said sound sources has when captured by said two sound collecting microphones, respectively;

an image processing means for determining the direction of each of said objects possibly being said sound sources, from information for image pictures imaged by said imaging means and/or directional information for each of said objects sensed by said sensing means;

directional filters; and

a control means for controlling operations of said sound collecting means, said imaging means and/or said sensing means, said image processing means, and said sound processing means,

wherein the operations of said sound collecting means, said imaging means and/or said sensing means, said image processing means, and said sound processing means, are so controlled by said control means that:

said sound processing means predetermines rough directions of said sound sources from information for said sounds captured by said sound collecting means, and said image processing means determines the direction of each of said objects possibly being said sound sources within a range defined by said predetermined rough directions; or

said image processing means predetermines directions of said sound sources only from information for image pictures imaged by said imaging means and/or directional information for each of said objects sensed by said sensing means, and said sound processing means determines the directions of said sound sources within a range of angles defined by said predetermined directions; or

said sound processing means predetermines rough directions of said sound sources only from information for said sounds captured by said sound collecting means, and said sound processing means selects said directional filters corresponding to said predetermined directions of said sound sources,

whereby it is made possible to identify the directions of all said sound sources and to separate them from one another even if neighboring ones of them lie close by.

Claim 17 (Currently Amended) A sound source identifying and separating apparatus as set forth ~~forth~~ forth in claim 16, characterized in that said sensing means is adapted to sense said objects possibly being said sound sources in response to magnetism thereof.

Claim 18 (Previously Presented) A sound source identifying and separating apparatus as set forth in claim 16, characterized in that said sensing means is adapted to sense said objects possibly being said sound sources in response to infrared rays that they emit.

Claim 19 (Previously Presented) A sound source identifying and separating apparatus as set forth in claim 16 or claim 17, characterized in that said objects possibly being said sound sources have each a magnetic carrying material attached thereto.

Claim 20 (Previously Presented) A sound source identifying and separating apparatus as set forth in any one of claim 16 to claim 18, characterized in that said image processing means has a function to determine direction of all said objects possibly being said sound sources on the basis of a color of a said object.

Claim 21 (Previously Presented) A sound source identifying and separating apparatus as set forth in any one of claim 16 to claim 18, characterized in that said image processing means has a function to determine directions of all said objects possibly being said sound sources on the basis of a shape of a said object.

Claim 22 (Previously Presented) A sound source identifying and separating apparatus as set forth in any one of claim 16 to claim 18, characterized in that said image processing means has a function to determine direction of all said objects possibly being said sound sources on the basis of a color, a shape and a height together of a said object.

Claim 23 (Previously Presented) A sound source identifying and separating method, characterized in that it comprises:

a first step of capturing mixed sounds from a plurality of sound sources with a pair of sound collecting microphones juxtaposed with each other across a preselected spacing and opposed to the sound sources, said two sound collecting microphones each individually capturing said mixed sounds from said sound sources;

conducted concurrently with the first step, a second step in which an imaging means consecutively images objects that can be said sound sources to produce image pictures thereof and/or a sensing means senses directions in which said objects are located;

a third step in which a sound processing means determines a rough direction of each of all said sound sources from sound information for said mixed sounds captured in the first step and

on the basis of information in said sound information for a difference between phases and a difference between intensities;

a fourth step in which an image processing means determines a direction of each of said objects possibly being all said sound sources from information for the image pictures produced and/or information for the direction sensed in the second step, within a range defined by such rough directions determined in the third step;

a fifth step in which said sound processing means determines a direction of each of all said sound sources on the basis of said sound information for a difference between phases and a difference between intensities, within a range of angles defined by such directions determined in the fourth step;

a sixth step in which said sound processing means selects a particular directional filters in accordance with the direction determined in the fifth step of each of all said sound sources to separate all said sound sources from one another;

a seventh step in which said image processing means determines a direction of each of all said objects possibly being said sound sources on the basis of information for the image pictures produced and/or information for the direction sensed by said sensing means in the second step, and said sound processing means determines a direction of each of all said sound sources on the basis of said sound information for a difference between phases and a difference between intensities as aforesaid within a range of angles defined by thus determined directions, and selects' a particular directional filter in accordance with the thus determined direction of each of

all said source to separate all said sound sources from one another; and

an eight step in which said sound processing means selects such particular filters in accordance with such rough directions determined in the third step to separate all said sound sources from one another.

Claim 24 (Currently Amended) A sound source identifying and separating method as set forth in claim [[22]] 23, characterized in that the direction sensing by said sensing means is effected in response to an infrared ray.

Claim 25 (Currently Amended) A sound source identifying and separating method as set forth in claim [[22]] 23 characterized in that the direction sensing by said sensing means is effected in response to magnetism.

Claim 26 (Previously Presented) A sound source identifying and separating method as set forth in claim 23, characterized in that the direction of each of all said objects possibly being said sound sources is determined by said image processing means on the basis of a color thereof.

Claim 27 (Previously Presented) A sound source identifying and separating method as set forth in claim 23, characterized in that the direction of each of all said objects possibly being said sound sources is determined by said image processing means on the basis of a shape thereof.

Claim 28 (Previously Presented) A sound source identifying and separating method as set forth in claim 23, characterized in that the direction of each of all said objects possibly being said sound sources is determined by said image processing means on the basis of a color, a shape and a height thereof.

Claim 29 (Previously Presented) A sound source identifying method as set forth in claim 23, characterized in that determination of the direction of each of all said sound sources by said sound processing means on the basis of sound information for a difference between phases and a difference between intensities is effected by determining a position of each of said sources on the basis of a signal for each of frequency bands arbitrarily divided into.

Claim 30 (Previously Presented) A sound source identifying method as set forth in claim 23, characterized in that said position information of a said object possibly being a said sound source is derived from a movement of said object.